DECLARATION

I, Masaharu Kobayashi, a patent attorney, of c/o Kobayashi Patent Office, Sansho 133 Building, 2nd Floor, 33-2, Takadanobaba 1-chome, Shinjuku-ku, Tokyo 169, Japan, hereby declare that I have translated Japanese Patent Application No. 98405/1998 filed March 26, 1998 and attach a copy of my translation hereto and certify that it is a true translation to the best of my knowledge and belief.

All statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and the like so made are punished by fines or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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M Kobayashi

Masaharu KOBAYASHI

(Translation)

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[Inventor]

[Address] C/O Electronic Material Division of Tomoegawa Paper Co., Ltd., 3-1 Mochimunetomoe-cho, Shizuoka-shi, Shizuoka-ken

[Name] Takuma HATTORI

[Inventor]

[Address] C/O Electronic Material Division of Tomoegawa Paper Co., Ltd., 3-1 Mochimunetomoe-cho, Shizuoka-shi, Shizuoka-ken

[Name] Masami YANAGISAWA

[Inventor]

[Address] C/O Electronic Material Division of Tomoegawa Paper Co., Ltd., 3-1 Mochimunetomoe-cho, Shizuoka-shi, Shizuoka-ken

[Name] keiichiro HAJI

[Applicant]

[ID Number] 000153591

[Name] Tomoegawa Paper Co., Ltd.

[Representative] Shojiro HOSOI

[Attorney]

[ID Number] 100086128

[Address] Sansho 133 Bldg., 2nd Floor, 33-2, Takadanobaba 1-chome, Shinjuku-ku, Tokyo

[Patent Attorney]

[Name] Masaharu KOBAYASHI

[Telephone Number] 03-3209-6390

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[Title of Document] Specification

[Title of the Invention] Attachment Film for Display Device

[Scope of Patent Claims]

[Claim 1] An attachment film for a display, which is characterized in that the attachment film comprises an adhesive layer which contains carbon black dispersed therein and is formed on one surface of a transparent substrate.

[Claim 2] An attachment film for a display according to claim 1, which is characterized in that an anti-reflection layer is formed on one surface or each surface of the transparent substrate.

[Claim 3] An attachment film for a display according to claim 1 or 2, which is characterized in that the adhesive layer further contains a coloring pigment different from the carbon black.

[Claim 4] An attachment film for a display according to claim 1,2 or 3, which is characterized in that the attachment film is colored in neutral gray.

[Claim 5] An attachment film for a display according to claim 1, wherein the carbon black in the adhesive layer has an average particle diameter of 30 mμm or less and has a BET specific surface area of at least 100 m^2/g.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention]

The present invention relates to an attachment film for displays such as Cathode Ray Tube (CRT) and a liquid crystal display device. More specifically, it relates to an attachment film for a display, which is for adjusting the quantity of transmitted light from a light source and the scattering of transmitted light and for

preventing the reflection of a fluorescent lamp and sun light in and from a display device screen.

[0002]

[Prior Art]

Conventionally, a glass unit as a screen of a display device such as a plasma display or TV cathode ray tube contains a colorant such as carbon black. The colorant is used for adjusting the quantity of transmitted light from a light source. For example, in a cathode ray tube having a fluorescent material which forms a color by the irradiation with electron beams, white is formed by mixing three colors such as red, green and blue, and black is formed in a color-non-forming portion. As a result, the cathode ray tube has a characteristic that the intensity of white is high and the intensity of black is low. A glass unit as a display device screen is therefore colored in gray for controlling white and intensifying black. In recent years, there are increasingly used displays having a cathode ray tube, etc., of which the light source side is formed as a curved surface and the viewer side, i.e., the front side is formed as a flat surface. In a display of the above type, the screen of a glass unit has a small thickness in the central portion thereof, and the thickness increases toward circumferential portions. In the above glass unit having a change in thickness, the central portion is required to be colored densely, and it is required to decrease the coloring toward the circumferential portions, for accomplishing a uniform optical transmissivity and a uniform scattering ratio of the glass unit on the entire screen of the glass unit. However, the decreasing the coloring toward the circumferential portions of the glass unit makes its

production process complicated and requires an additional cost. Further, it is required to alter a gray scale variously depending upon a colorant used or a display material used. The coloring of the glass unit for satisfying the above demands is liable to make the production process thereof complicated and incur an increase in its production cost. Further, with an increase in the size of a display, a fluorescent lamp and sun light is reflected in the screen to a greater extent, and it is more intensely demanded to prevent the above reflection. When the optical transmissivity and the scattering ratio of the glass unit as a display device screen does not match a display material, a black and white contrast is deteriorated, and images showing original hues can be no longer viewed.

[0003]

[Problems to be solved by the Invention]

It is an object of the present invention to provide an attachment film for a display, which film is used for adjusting the optical transmissivity depending upon a variety of displays and adjusting color shades and, further, which film permits the simple and easy adjustment of the reflection of a fluorescent lamp and sun light in and from the screen thereof.

[0004]

[Means to Solve the Problems]

The present inventors have made diligent studies, and as a result, it has been found that the above objects can be achieved by a film obtained by forming an adhesive layer containing a colorant on one surface of a substrate. That is, the present invention provides an attachment film for a display, which comprises a substrate and an adhesive

layer formed on one surface of a substrate, the adhesive layer containing carbon black dispersed in the adhesive layer.

According to the present invention, there is also provided an attachment film for a display, which is characterized in that the attachment film comprises an adhesive layer which contains a colorant dispersed therein and is formed on one surface of a transparent substrate of which one surface or each surface comprises an anti-reflection layer.

According to the present invention, there is also provided an attachment film for a display according to the above, which is characterized in that the adhesive layer further contains a coloring pigment different from the above colorant.

According to the present invention, there is also provided an attachment film for a display, which is colored in neutral gray.

According to the present invention, there is also provided an attachment film for a display, wherein a carbon black in the adhesive layer has an average particle diameter of 30 mμm or less, preferably 20 mμm or less, and has a BET specific surface area of at least 100 m^2/g, preferably at least 250 m^2/g.

[0005]

[Embodiment of the Invention]

The display referred to in the present invention preferably means a display in which an image display portion on the viewer (watcher) side has a flat surface at least along the lateral axis direction or the vertical axis direction, such as a display having a display portion on the viewer side which display portion is flat both along

the lateral axis direction and the vertical axis direction and having a display portion on the color-forming light source which display portion has a curved surface, i.e., sphere surface, or a display having a display portion on the viewer side which display portion is curved along the vertical axis direction, i.e., cylindrical. The display to which the present invention can be applied includes various electronic displayes such as a liquid crystal display (LCD), a plasma display (PDP), a CRT, an electroluminescence (EL), and the like.

[0006]

The substrate used in the present invention is preferably selected from colorless transparent films. However, the color shade can be adjusted by properly incorporating various colorants into an adhesive layer, and the presence of a color shade to some extent is therefore tolerable. The films used in the present invention include a polyethylene terephthalate (PET) film, a triacetyl cellulose (TAC) film, a polyallylate film, a polyimide film, a polyether film, a polycarbonate film, a polysulfone film, a polyether sulfone film, a cellophane film, an aromatic polyamide film, a polyethylene film, a polypropylene film and a polyvinyl alcohol film. Particular preferred are a PET film and a TAC film.

[0007]

For preventing the reflection of an external incident light, an anti-reflection layer may be formed on one surface or both surfaces of the transparent substrate. The anti-reflection layer is formed by roughening a light-incidence surface or by forming layers having different refractive indices. The roughened surface is formed by a method such as a sandblasting method, an embossing method

or a method in which a filler-containing resin is applied. There may be employed a conventionally known method in which a low-refractivity layer of siloxane or the like is formed on the surface of the transparent substrate and a high-refractivity layer and a low-refractivity layer are consecutively formed. A high-refractivity layer can be formed from an inorganic material such as a metal or a metal oxide by deposition or sputtering.

For improving the transparent substrate in adhesion to the anti-reflection layer or the adhesive layer, it is preferred to carry out surface modification treatment on the transparent substrate. The surface modification treatment can be selected from surface treatments such as alkali treatment, corona treatment, plasma treatment, fluorine treatment, sputtering treatment or application of a surface active agent or a silane coupling agent, as required.

For preventing soiling such as the adherence of dust on a display surface, an antistatic layer may be formed on an outer side of the transparent substrate. The antistatic layer can be formed, as required, by a method in which a very thin film of a metal such as aluminum, tin, etc., or a metal oxide such as ITO is formed by deposition or sputtering, or by a method in which fine particles or whiskers of a metal such as aluminum, tin, etc., or fine particles of metal oxide such as tin oxide doped with antimony, etc., are dispersed in a polyester resin or an acrylic resin and the resultant dispersion is coated.

[0008]

The attachment film for a display, provided by the present invention, is attached, for example, to a flat display on the viewer (watcher) side, i.e., on the side

opposite to the color-forming light source, and it is used for a long period of time. The attachment film is therefore required to retain weatherability and light resistance for a long period of time. For satisfying the above requirement, conventionally known additives such as an ultraviolet absorbent, a photo-stabilizer, a metal inactivating agent and an ozone-deterioration preventer may be added to the adhesive layer, the antistatic layer, etc., as required. The transparent substrate has a thickness of 20 to 300 μm, preferably 50 to 200 μm.

[0009]

The carbon black suitable for use in the present invention has an average particle diameter of, preferably, 30 mμm or less, more preferably 20 nm or less, and a BET specific surface area of at least 100 m^2/g, more preferably at least 250 m^2/g. For adjusting the transmissivity and the scattering ratio of an image display portion to proper ranges, it is preferred that the carbon black should have an average particle diameter and a BET specific surface area in the above ranges. Further, more preferably, the carbon black used in the present invention has the following properties; It shows a high oil absorption amount, it is an acidic carbon having a pH of 4 or less, and it has a volatile content of at least 10 % by weight. Carbon blacks which have the above properties are easily commercially available. For example, there are "Color Black FW200", "Special Black 4", "Color Black FW 2" and "Special Black 6", (these are all supplied by Degussa, Germany), "#2350" and "#2400" (these are all supplied by Mitsubishi Chemical Co., Ltd.), "MONARCH 1300", "MONARCH 1400", "MONARCH 1000", "Black Pearls 1300", "Black Pearls 1400" and "Black Pearls 1000" (these are all supplied by

Cabbot), and "Raven 7000", "Raven 5750", "Raven 5000" and "Raven 3500" (these are all supplied by Columbia).

[0010]

In the present invention, the light scattering ratio is also expressed as a haze. The haze is a value determined by the following equation using measurement data.

Haze (%) = (intensity of scattered light/intensity of all of transmitted light) x 100

Generally, it is said that the color tone of a glass unit as an image display portion is desirably of neutral gray. Neutral gray means a hue having an a-value and a b-value which are nearly zero in the expression of a hue by Lab. More specifically, it means a hue having an a-value and a b-value of within 5 %. When a carbon black alone is added to the adhesive layer, an intended hue is not obtained in some cases, a brown hue is liable to be formed, some color-forming material impairs a black and white contrast, or various hues may be impaired in some cases. Therefore, a pigment is added for adjusting the hue of the attachment film depending upon requirements caused by a change in a color-forming material. As a pigment, it is preferred to use a pigment having an average particle diameter of 0.02 to 5 μm, more preferably 0.05 to 1 μm.

Examples of the pigment preferred in the present invention include isoindolinone pigments, anthraquinone pigments, dioxazine pigments, azo pigments, quinophthalone pigments, azomethine pigments, benzimidazolone pigments, perinone pigments, pyranthrone pigments, quinacridone pigments, perylene pigments, pyranthrone pigments, phthalocyanine pigments and durene pigments. These pigments may be used in combination as required for obtaining an intended hue.

For adjusting the hue, a dye may be incorporated. However, a dye is poor in weatherability, and it cause a large change in transmissivity when used for a long period of time. A dye is therefore not suitable for use in the present invention.

[0011]

The adhesive used in the present invention preferably has the property of being re-separable and leaves no component when peeled off. Further, it is preferably free of peeling and the occurrence of bubbles during an accelerated aging test under a high-temperature and high-humidity environment. The adhesive having the above properties can be properly selected from acrylic adhesives, rubber-based adhesives, polyvinyl ether adhesives and silicone adhesives as required. Acrylic adhesives are the most preferred.

An acrylic adhesive is obtained by copolymerizing an alkyl (meth)acrylate with a polymerizable unsaturated carboxylic acid or a hydroxyl-group-containing ethylenically unsaturated monomer or further with a copolymerizable vinyl monomer in an organic solvent. The alkyl (meth)acrylate contains an alkyl group having 1 to 12 carbon atoms, and it includes methyl (meth)acrylate, butyl (meth)acrylate, octyl (meth)acrylate and the like. The polymerizable unsaturated carboxylic acid includes acrylic acid, methacrylic acid, crotonic acid, itaconic acid, maleic acid and fumaric acid.

The hydroxyl-group-containing ethylenically unsaturated monomer includes hydroxymethyl (meth)acrylate 2-hydroxyethyl (meth)acrylate, and N-methylolacrylamide. The copolymerizable vinyl monomer includes vinyl acetate, vinyl propionate, vinyl butyrate, styrene and acrylonitrile.

The copolymerization is carried out in an organic solvent such as ethyl acetate or toluene in the presence of a polymerization initiator such as benzoyl peroxide and azobisisobutyronitrile.

The adhesive may contain a crosslinking agent. The amount of the crosslinking agent is generally 0.01 to 10 parts by weight per 100 parts by weight of the acrylic adhesive. The crosslinking agent includes isocyanate compounds, aluminum chelate compounds, aziridinyl compounds and epoxy compounds.

The adhesive is prepared in the form of an organic solvent solution and applied to a transparent substrate with a coating machine such as a roll coater or a reverse coater. A film or paper treated to be separable may be laminated on the adhesive layer surface of the transparent substrate, for handling conveniences.

[0012]

The present invention will be explained more in detail with reference to Examples hereinafter.

Preparation Examples

<Polymerization Example of Acryl Polymer (a)>

A flask having a thermometer, a stirrer, a reflux cooling tube and a nitrogen-introducing tube was charged with 94 parts by weight of n-butyl acrylate, 6 parts of acrylic acid, 0.3 part by weight of benzoyl peroxide, 40 parts by weight of ethyl acetate and 60 parts by weight of toluene, and then nitrogen was introduced through the nitrogen-introducing tube to provide a nitrogen atmosphere in the flask. Then, the contents were heated up to 65°C, and polymerization was carried out, for 10 hours, to give an acryl polymer solution having a weight average molecular

weight of approximately 1,200,000 and a Tg of about -49°C. Ethyl acetate was added to the acryl polymer solution such that the resultant solution had a solid content of 20 % by weight, whereby an acryl polymer solution (a) for a master batch was obtained. To 100 parts by weight (as a solid content) of the solution was added 0.1 part by weight of N,N,N',N'-tetraglycidyl-m-xylylenediamine, to give an adhesive coating liquid (a').

[0013]

<Polymerization Example of Acryl Polymer (b)>

A flask having a thermometer, a stirrer, a reflux cooling tube and a nitrogen-introducing tube was charged with 96 parts by weight of n-butyl acrylate, 3 parts by weight of acrylic acid, 1 part by weight of 2-hydroxyethyl acrylate, 0.3 part by weight of benzoyl peroxide, 40 parts by weight of ethyl acetate and 60 parts by weight of toluene, and then nitrogen was introduced through the nitrogen-introducing tube to provide a nitrogen atmosphere in the flask. Then, the contents were heated up to 65°C, and polymerization was carried out, for 10 hours, to give an acryl polymer solution having a weight average molecular weight of approximately 1,000,000 and a Tg of about -50°C. Ethyl acetate was added to the acryl polymer solution such that the resultant solution had a solid content of 20 % by weight, whereby an acryl polymer solution (b) for a master batch was obtained. To 100 parts by weight (as a solid content) of the solution was added 0.1 part by weight of polyisocyanate ("Coronate L", supplied by Nippon Polyurethane), to give an adhesive coating liquid (b').

[0014]

Example 1

To 100 parts by weight (as a solid content) of

the acryl polymer solution a for a master batch was added 6 parts by weight of carbon black ("Special Black 6" supplied by Degussa, primary particle diameter 17 μm, BET specific surface area 300 m^2/g, volatile content 18 % by weight, pH 2.5), and the mixture was fully stirred to obtain a master batch solution A in which carbon black was fully dispersed.

1 Part by weight of the master batch solution A was added to 100 parts by weight of the adhesive coating liquid (a')(adhesive concentration 20 % by weight), and the mixture was stirred so as to form a homogeneous solution. Then, the solution was applied to a 38 μm thick PET film which had been treated to be separable, such that a dry adhesive layer had a thickness of 25 μm, and the resultant layer was dried. A transparent PET film was treated by ITO sputtering to form an anti-reflection layer on one surface thereof, and the adhesive layer surface of the above film was attached to a non-treated surface of the above-treated transparent PET film having a thickness of 188 μm, to give a colored adhesive film of the present invention.

[0015]

Example 2

A master batch solution B was prepared in the same manner as in Example 1 except that the carbon black was changed from 6 parts by weight of Special Black 6 to 11 parts by weight of Color Black FW200 (supplied by Degussa, primary particle diameter 13 μm, BET specific surface area 460 m^2/g, volatile content 20 % by weight, pH 2.5).

2 Parts by weight of the master batch solution B was added to 100 parts by weight of the adhesive coating liquid (a') (adhesive concentration 20 % by weight), and the mixture was stirred so as to form a homogeneous solution. Then, the solution was applied to a 38 μm thick

PET film which had been treated to be separable, such that a dry adhesive layer had a thickness of 25 μm, and the resultant layer was dried. A transparent PET film was treated for the prevention of reflection in the same manner as in Example 1, and the adhesive layer surface of the above film was attached to a non-treated surface of the above-treeated transparent PET film having a thickness of 188 μm, to give a colored adhesive film of the present invention.

[0016]

Example 3

A master batch solution C was prepared in the same manner as in Example 1 except that the carbon black was changed from 6 parts by weight of Special Black 6 to 4.5 parts by weight of Special Black 4 (supplied by Degussa, primary particle diameter 25 μm, BET specific surface area 180 m^2/g, volatile content 14 % by weight, pH 3).

1 Part by weight of the master batch solution C was added to 100 parts by weight of the adhesive coating liquid (a')(adhesive concentration 20 % by weight), and the mixture was stirred so as to form a homogeneous solution. Then, the solution was applied to a 38 μm thick PET film which had been treated to be separable, such that a dry adhesive layer had a thickness of 25 μm, and the resultant layer was dried. A transparent PET film was treated for the prevention of reflection in the same manner as in Example 1, and the adhesive layer surface of the above film was attached to a non-treated surface of the above-treated transparent PET film having a thickness of 188 μm, to give a colored adhesive film of the present invention.

[0017]

Example 4

8.5 Parts by weight of carbon black (Color Black FW200) and 5 parts by weight of a blue organic pigment (Monochlorocyanine Blue) were added to 100 parts by weight (as a solid content) of the acryl polymer b for a master batch, and the mixture was stirred to obtain a master batch solution D in which the carbon black and the blue pigment were fully dispersed.

2 Parts by weight of the master batch solution D was added to 100 parts by weight of the adhesive coating liquid (b')(adhesive concentration 20 % by weight), and the mixture was stirred so as to form a homogeneous solution. Then, the solution was applied to a 38 μm thick PET film which had been treated to be separable, such that a dry adhesive layer had a thickness of 25 μm, and the resultant layer was dried. A transparent PET film was treated for the prevention of reflection in the same manner as in Example 1, and the adhesive layer surface of the above film was attached to a non-treated surface of the above-treated transparent PET film havin a thickness of 188 μm, to give a colored adhesive film of the present invention.

[0018]

Example 5

A master batch solution E was prepared in the same manner as in Example 4 except that 5 parts by weight of the blue organic pigment (Monochlorocyanine Blue) was replaced with 5 parts by weight of a red organic pigment (Quinacridone Red).

2 Parts by weight of the master batch solution E was added to 100 parts by weight of the adhesive coating liquid (b')(adhesive concentration 20 % by weight), and the mixture was stirred so as to form a homogeneous solution. Then, the solution was applied to a 38 μm thick PET film

which had been treated to be separable, such that a dry adhesive layer had a thickness of 25 μm, and the resultant layer was dried. A transparent triacetyl cellulose (TAC) film was treated for the prevention of reflection by applying siloxane, and the adhesive layer surface of the above film was attached to a non-treated surface of the above-treated transparent TAC film having a thickness of 80 μm, to give a colored adhesive film of the present invention.

[0019]

Example 6

7.5 Parts by weight of carbon black (Color Black FW200), 22 parts by weight of a blue organic pigment (Monochlorocyanine Blue) and 11 parts by weight of a red organic pigment (Quinacridone Red) were added to 100 parts by weight (as a solid content) of the acryl polymer solution b for a master batch, and the mixture was stirred to obtain a master batch solution F in which the carbon black, the blue pigment and the red pigment were fully dispersed.

2 Parts by weight of the master batch solution F was added to 100 parts by weight of the adhesive coating liquid (b')(adhesive concentration 20 % by weight), and the mixture was stirred so as to form a homogeneous solution. Then, the solution was applied to a 38 μm thick PET film which had been treated to be separable, such that a dry adhesive layer had a thickness of 25 μm, and the resultant layer was dried. A transparent PET film was treated for the prevention of reflection in the same manner as in Example 1, and the adhesive layer surface of the above film was attached to a non-treated surface of the above-treated transparent PET film having a thickness of 188 μm, to give

a colored adhesive film of the present invention.

[0020]

Example 7

2 Parts by weight of the master batch solution B was added to 100 parts by weight of the adhesive coating liquid (a')(adhesive concentration 20 % by weight), and the mixture was stirred so as to form a homogeneous solution. Then, the solution was applied to a 38 μm thick PET film which had been treated to be separable, such that a dry adhesive layer had a thickness of 50 μm, and the resultant layer was dried. A transparent PET film was treated for the prevention of reflection in the same manner as in Example 1, and the adhesive layer surface of the above film was attached to a non-treated surface of the above-treated transparent PET film having a thickness of 188 μm, to give a colored adhesive film of the present invention.

[0021]

Comparative Example 1

A solution of 2.4 parts by weight of a spiron dye (metal complex) (TK-Smoke, supplied by Toa Kasei) was added to 100 parts by weight of the adhesive coating liquid (b')(adhesive concentration 20 % by weight), and the mixture was stirred so as to form a homogeneous solution. Then, the solution was applied to a 38 μm thick PET film which had been treated to be separable, such that a dry adhesive layer had a thickness of 25 μm, and the resultant layer was dried. A transparent PET film was treated for the prevention of reflection in the same manner as in Example 1, and the adhesive layer surface of the above film was attached to a non-treated surface of the above-treated transparent PET film having a thickness of 188 μm, to give a comparative colored adhesive film.

[0022]

Comparative Example 2

A solution of 2.4 parts by weight of a spiron dye (metal complex) (TK-Smoke, supplied by Toa Kasei) and 2 parts by weight of an ultraviolet absorbent ("TINUVIN 109", supplied by Ciba Geigy AG) were added to 100 parts by weight of the adhesive coating liquid (a')(adhesive concentration 20 % by weight), and the mixture was stirred so as to form a homogeneous solution. Then, the solution was applied to a 38 μm thick PET film which had been treated to be separable, such that a dry adhesive layer had a thickness of 25 μm, and the resultant layer was dried. A transparent PET film was treated for the prevention of reflection in the same manner as in Example 1, and the adhesive layer surface of the above film was attached to a non-treated surface of the above-treated transparent PET film having a thickness of 188 μm, to give a comparative colored adhesive film.

[0023]

<Preparation of Sample for Evaluation>

The PET film (38 μm) which had been treated to be separable was separated from each of the colored adhesive films obtained in Examples and Comparative Examples, and colored adhesive films were attached to glass plates (micro-slide glass, supplied by Matsunami Glass Co.) to prepare samples for evaluation for carrying out the following tests.

• Discoloration test with fademeter

A sample for evaluation was set in a fademeter (Ultraviolet long life - fademeter FAL-AU model, supplied by Suga Testing Machinery) such that the colored adhesive film side was exposed, and after 400 hours, the sample was

measured for a transmissivity and a haze.

• Measurement of transmissivity

Before and after a sample was set in the fademeter, the sample was measured, from the colored adhesive film side, for a transmissivity to light having a wavelength of 550 nm with a spectrophotometer (Visible-ultraviolet spectrophotometer UVDEC-670 model, supplied by Nippon Bunko Kogyosha).

• Measurement of haze

Before and after a sample was set in the fademeter, the sample was measured for a haze from the colored adhesive film side with a haze meter (Haze Meter NDH2000, supplied by Nippon Denshokusha).

Table 1 shows the results of transmissivity and haze measurements of the above samples for evaluation.

[0024]

Table 1

	Before setting in fademeter		400 Hours after setting in fademeter	
	Transmissivity (%)	Haze	Transmissivity (%)	Haze
Ex. 1	71.5	1.9	71.8	1.8
Ex. 2	38.2	1.6	38.3	1.7
Ex. 3	82.2	2.1	83.4	2.2
Ex. 4	56.3	2.5	57.0	2.3
Ex. 5	57.4	2.7	57.8	2.6
Ex. 6	56.2	2.5	56.7	2.6
Ex. 7	37.6	2.8	37.8	2.8
CEx. 1	43.5	0.8	58.9	1.1
CEx. 2	41.2	0.9	50.7	1.1

Ex. = Example, CEx. = Comparative Example

[0025]

It is preferred that there should be no difference between the transmissivity and the haze before

setting in the fademeter and those after testing with the fademeter, and the haze is preferably 3 or less. Each comparative sample showed large differences between the transmissivity data before setting in the fademeter and those after testing with the fademeter.

The colored adhesive films obtained in Examples and Comparative Examples were evaluated for a black and white contrast as follows. A colored adhesive film was attached to a left half of a cylindrical screen of a color graphic display ("D1726T-HS", supplied by DELL) for a personal computer, and the black and white contrast on each of the left half and the right half of the screen was visually evaluated while the display was set to have a high brightness. Further, the reflection of a fluorescent lamp (room lamp) in the display at a standard brightness was visually evaluated.

When the colored adhesive films of the present invention were attached, black and white were clearly distinguished on the screen as compared with a case where no film was attached, and the black and white contrast was excellent. Further, the reflection of the fluorescent lamp in the screen to which each of the colored adhesive films of the present invention was attached was inhibited as compared with a case where no film was attached.

[0026]

[Effect of the Invention]

According to the present invention, the transmissivity and the hue of light from a light source for color formation can be easily, simply and inexpensively adjusted by attaching a transparent substrate on which an adhesive layer containing carbon black and optionally an organic pigment is formed to the outer surface of a glass

unit of an image display device.

[Title of Document] Abstract

[Abstract]

[Object] To provide an attachment film for a display, which film is used for adjusting the optical transmissivity depending upon a variety of displays and adjusting color shades and permits the simple and easy adjustment of the reflection of a fluorescent lamp and sun light in and from the screen thereof.

[Means for Solution] an attachment film for a display, which comprises a transparent substrate and an adhesive layer containing carbon black and optionally a coloring pigment dispersed therein and formed on one surface of the transparent substrate.

[Selected Drawings] Nil.